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FOR NORTHERN IRELAND

EXAMINATION OF THE
HORTICULTURAL INDUSTRY
1965

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Foreword

THE attached record summarises the findings of an examination during 1965, in consultation with the Farmers' Unions, of developments within the horticultural industry in the United Kingdom.

Periodic examinations of this kind, to include the evidence available on such matters as costs of production and the trends in prices and imports, and the progress made towards achieving a higher degree of competitive efficiency, were foreshadowed by the former Minister of Agriculture in the course of a statement on horticultural policy in the House of Commons on 27th November, 1963. We have found the examination helpful and have welcomed the collaboration of the Farmers' Unions in this objective survey of the problems of the industry. We intend to conduct a similar examination in 1967.

The purpose of the examination was to elicit the facts about the industry, the changes that are taking place, and the opportunities open to growers. It can serve to indicate how present policies are working out, and provide a factual basis for the discussion and development of new policies.

The revolution in farming techniques began during the war. That in horticulture could not begin until the war was over. But it has been gathering pace; and the next few years should see rapid and significant developments in the production and marketing of home grown produce that will be of material benefit to growers and to the economy as a whole. The industry faces a challenge. We believe that British growers will respond.

FREDERICK PEART

Minister of Agriculture, Fisheries and Food

WILLIAM ROSS

Secretary of State for Scotland

ROY JENKINS

Secretary of State for the Home Department

3rd March, 1966

EXAMINATION OF THE HORTICULTURAL INDUSTRY, 1965

Introduction

1. To the consumer, making his choice from a great range of fruit, vegetables and flowers in the same retail shop, horticulture may have the appearance of a single industry. But from the production standpoint horticulture covers a wide variety of enterprises, with different techniques and different problems. Its annual output (about £180 million in the United Kingdom) is only one-tenth that of agriculture and horticulture combined, but it is in many respects more diversified and its different sections are more specialised and self-contained than the different sections of agriculture.

2. For the purpose of the examination, developments in fruit, vegetable, glasshouse, flower and nursery stock production over the past ten years were first considered separately and were then brought together for consideration in the context of developments and progress in the industry as a whole. This record of the examination summarises the main points which emerged, in the hope that this will be valuable and of interest not only in itself, but as a starting point for the next examination of the industry which will take place in 1967, and which will need to pay particular regard to the progress of the industry towards a higher degree of competitive efficiency.

3. The statistical tables in this record and its appendices are designed to illustrate the points brought out in the examination. They are generally taken from published sources, to which reference should be made if comprehensive statistics are required.

Structure

4. The chief aspects considered in looking at the structure of the industry were its subdivision into different sections, the extent to which production in each section was carried on in large, medium or small units, and on specialised or mixed enterprises, and the location of production. In all these aspects it was found that material changes have taken place over the past ten years. Horticulture is, in fact, showing an encouraging readiness to adapt itself to changing economic factors, new technical developments and the requirements of the market.

5. As an indication of the relative importance of each of the main sections of the industry, the summary tables below show acreages over the past ten years and the current value of output. Detailed figures of acreage and output are given in Appendices I and II.

TABLE 1
Area Under Crops

	Averages per year		
	1952/53 to 1956/57 (acres)	1956/57 to 1960/61 (acres)	1960/61 to 1964/65 (acres)
Top and Soft Fruit—U.K. (a)	307,373	287,814	258,369
Vegetables in the open—U.K. (excluding peas harvested dry and green peas for canning and quick freezing) (a)	334,419	333,217	327,694
Fruit, Flowers and Vegetables under glass and in frames and sheds—England and Wales only (a)	6,890	6,733	6,745
Bulbs and Flowers in the open—England and Wales only (b)	14,133	16,975	18,527
Hardy Nursery Stock—England and Wales only (b)	11,706	12,994	13,731

(a) Based on one or more censuses with allowances for double cropping, failures, etc.
(b) June 4th Census.

TABLE 2
Value of Output at the farm gate—U.K. 1964/65 (Provisional)

	£ million
Fruit in the open (a)	50.5
Vegetables in the open (a) (b)	60.6
Flowers and bulbs in the open (a)	6.5
Hardy Nursery Stock	15.4
All crops under Glass (c)	41.5
Total (b)	174.5

(a) Including the relatively small value of output from non-commercial holdings of over one acre.

(b) Excluding peas harvested dry and green peas for canning and quick freezing, the total value of which was £9.7m.

(c) Including mushrooms (the value of which was £7.6m.) and production from frames, etc.

6. Horticulture cannot, of course, be considered as distinct and separate from farming: certain vegetable crops in particular are produced by growers whose primary interest is in farming. A broad analysis of holdings in England and Wales which grew horticultural crops in 1963 picked out as horticultural specialists those which, judging by the crops they grew, were likely to have more

employment in horticulture than in farming. From this analysis it appeared that more than half the vegetables were grown on non-specialist holdings; but that on the other hand the greater part of the fruit and virtually all the glasshouse production was accounted for by the horticultural specialists.

7. The bulk of horticultural production comes from the larger units. Of some 34,000 holdings with orchards disclosed in the 1962 June Census returns, only 4,273 (12½ per cent) had 10 acres or more of orchards, but they accounted for nearly 70 per cent of the acreage. Growers of 4 acres or more of small fruit numbered only 2,275 (17 per cent) but accounted for over 70 per cent of the acreage. Some 4,700 growers of 20 or more acres of vegetables (13 per cent of all vegetable growers) accounted for two-thirds of the vegetable acreage. And in 1965 over a third of the total glasshouse area was on some 200 holdings with 2½ acres or more of glass.

CONCENTRATION

8. A significant difference between agriculture and horticulture is that the different forms of agriculture are generally to be found throughout the United Kingdom (although their relative importance varies of course from region to region) whereas a high proportion of horticultural output comes from a few fairly well defined parts of the country. The location of the industry in the past has broadly been a function of suitable soil or climate and proximity to markets. The relative importance of these factors has been changing in recent years. Appendix III illustrates for certain of the main crops both the contribution to national production of the chief growing areas, and how that contribution has changed during the period considered. Especially noteworthy is the growth of narcissus and of cauliflower production in Lincs. (Holland), of carrot production in Norfolk and of apple production in Kent and also the dominant position in raspberry production of Angus and East Perthshire. In Norfolk and Lincs. (Holland and Lindsey) 35 per cent of the vegetable acreage in England is now to be found as against 27 per cent eleven years ago.

9. The relative importance of market gardens close to urban centres and producing a variety of crops is declining as a result of developments in transport and other factors. Nevertheless the value of these enterprises in meeting a local demand for fresh produce must not be underestimated. Grower-wholesalers are still a prominent feature of many markets, including those serving Central London, and provision for them is being made in the re-development plans mentioned in paragraph 26 below. Proximity to towns can, however, create problems, particularly for sectors of horticulture involving heavy capital investment, such as the glasshouse industry, which cannot readily change their location. For many glasshouse growers in the Lea Valley proximity to London has gradually become a liability rather than an asset, as nearby urban development and air pollution have made growing conditions less satisfactory. Table 3 below illustrates the decline in the glasshouse area in the United Kingdom, and particularly the decline in the Lea Valley which might well proceed faster if planning problems could be resolved, enabling growers to realise the value of their existing sites and use the proceeds to re-establish themselves in areas where production conditions are more favourable. This problem is not confined to the Lea Valley.

TABLE 3
Glasshouse Area in the United Kingdom

	Acres		
	1954	1959	1965
<i>U.K. Total Glasshouse Area</i>	4,414	4,259	3,999
of which Lea Valley	965	821	632
Essex*	187	200	196
W. Sussex	300	281	251
Lancs.	301	290	275
Yorks. (all)	216	225	246
Lines. (Holland)	95	108	147
Clyde Valley	128	138	142

* (Other than parts in the Lea Valley.)

Census taken in June in Scotland and July in England and Wales—on commercial holdings only, and not counting areas of glass on holdings of one acre or less nor (except in Scotland) glass totalling less than 1,000 sq. ft. on any holding. For Northern Ireland the figure included in the U.K. total is an estimate.

10. The increasing concentration of production of certain of the main crops in a few localities, accompanied by increasing specialisation, has a number of advantages in meeting the needs of the national market for a regular supply of well-graded, good quality produce. As communications have improved, the grower has been able to place more emphasis on suitable growing conditions and less on proximity to a market. Concentration facilitates collaboration and co-operation in growing and marketing; enables advisory and technical facilities to be focussed; and leads, by emulation, to the readier adoption of new techniques. For certain vegetable crops, of which carrots are a particular example, mechanisation has made possible large-scale, low-cost production.

SPECIALISATION

11. Specialisation, too, has enabled fuller benefit to be gained from technical advances in the different sections of the industry. At the same time account must be taken of the hazards. A glut, or a failure of a particular crop, will mean a greater financial loss for the specialist than for the general grower, and his returns may also be more sharply affected by unpredictable changes in consumer demand. However, much of the produce from overseas is specially selected for the U.K. market; and growers who specialise in particular crops are most likely to develop the expertise needed to compete with it effectively.

12. The developments described in the foregoing paragraphs are an important factor in the increasing efficiency of the industry. They may be summarised as follows. Holdings with a mixed production, often small in scale, and located near provincial towns, still play an important role in supplying local needs. Larger units, often specialised, are tending to expand where natural conditions are best, and are in a position to take the fullest advantage of better production

and harvesting techniques and large-scale marketing. It is through such units, or smaller units acting in co-operation, that the main national demand for a regular supply of good quality, well graded produce can be met with benefit both to the consumer and to the grower.

Home Production, Imports and Prices

13. Despite falling acreages, the output of most crops has been relatively stable or has risen steadily over the past ten years (see Appendix II). Notable exceptions have been the total output of tomatoes and of cooking apples, each down by some 20 per cent. Mushrooms have been exceptional in the opposite way: output has quadrupled in the past ten years.

14. Yields per acre of nearly all crops are increasing steadily, owing to the development and adoption of better production techniques and, it may be, the movement of production to the most suitable growing areas. Some illustrations of increasing yields are in Table 4.

TABLE 4
England and Wales Gross Yield Estimates

	5-year average 1952/53-1956/57 tons per acre	5-year average 1960/61-1964/65 tons per acre
Carrots (main crop)	10.8	13.3
Cauliflower (summer and autumn)	6.4	7.6
Lettuce (glass-raised, transplanted)	6.7	10.3
Cox's Orange Pippin	3.8	4.8
Strawberries	2.2	2.9
Blackcurrants	1.7	1.9

Yields based on estimates from Horticultural Crop Intelligence Committees.

15. Home production of the crops whose bulk is high in relation to their value does not generally meet competition from imports. Conversely, some imports of horticultural products do not directly compete with home production, to the extent that they arrive outside the home season, but there may be some effect when imports arrive just as the home season is about to begin. The tables in Appendix IV show imports of fresh fruit and vegetables of kinds grown in the United Kingdom on a commercial scale, compared with home output.

16. Prices of most fruit and vegetables and some flowers are collected by the agricultural departments in certain representative wholesale markets, to show the "range" and "most usual" prices, and are published as weekly averages. These can be relied upon to indicate the general trend in prices, but owing to the absence of grades which are uniform as to size and quality, and the wide variations in price, they give a less reliable indication of the absolute level of prices. The returns do not of course cover the prices of produce which by-passes the wholesale markets.

17. Price levels within a season and between seasons are greatly affected by changes in acreages and yields, differences in quality and variety, fluctuations in imported supplies and by changes in demand. All these factors are themselves influenced by weather conditions both at home and overseas. Wholesale prices have fluctuated considerably from season to season, and were particularly low in 1960/61, but as a broad generalisation the price levels since that time have been somewhat above the level ten years ago.* The position varies from crop to crop, however, and price is but one of many factors affecting growers' returns.

Demand

18. There have been few methodical studies of demand for horticultural products, but the statistical note and tables reproduced as Appendix V, prepared in the course of the examination, cover some of the most important of the crops to which particular attention was given. They are based on data collected from the National Food Survey over recent years, and are intended to record experience rather than predict the future. Prediction involves assumptions about future trends in population, in real incomes, in prices and (not least) about changes in consumer preferences not attributable to changes in price or income. Past trends are therefore not necessarily a guide to the future.

19. However, the established pattern of demand within the year brings out a general point of interest to growers which is well illustrated by the tables. At the beginning and in some cases at the end of the production season, supplies are limited and some demand remains unsatisfied, particularly if few alternatives are available at the time.

20. This indicates that many sections of the industry would benefit from extending the production season, especially by advancing it, provided of course that the additional costs involved were more than covered by the higher prices obtainable when demand is strong. In order to enable the pattern of supply to conform more closely to that of demand, there is thus a need to extend the season by the use of new varieties or improved production techniques.

21. It may be useful to record here some comments on demand for particular crops.

(a) *Cauliflowers* are among the crops for which present trends in population and income are expected to lead to a moderate increase in consumption. Total supplies rise to a seasonal maximum in the spring and to a second peak in the autumn. As the earlier peak approaches, supplies tend to fall short of the expanding demand, which is accentuated by the scarcity of other green vegetables. In contrast, during the autumn the rise in supplies outpaces the rise in demand, because alternatives are plentiful.

(b) *Brussels sprouts* are generally available for only six months of the year, and the relative excess of demand over supply causes prices to be high at both ends of the production season. Exceptionally, prices of sprouts tend to be higher

* The published sources of this statement are the Agricultural Price Indices which are published monthly and are in due course brought together and printed in the volumes of Agricultural Statistics for the United Kingdom.

at the end of the season than at the beginning, because fewer alternatives are available to the housewife. The size of sprout demanded varies with the market. Most consumers prefer a medium-sized sprout, while processors prefer the smaller size, as do packers of frozen sprouts; nevertheless there is some demand for the larger varieties, especially prepared sprouts for canteens.

(c) Demand for home-grown *tomatoes* is strong whenever they are available. Attention is specially directed to the spring, when the pressure of demand for tomatoes builds up very rapidly.

(d) *Flowers* tend at present to be bought for special occasions: it is reasonable to expect that rising standards of living may make flower-buying more habitual and so increase both the number of purchasers and the frequency of their purchases. There is no such restriction here as the limit placed on food crops by "the narrow capacity of the human stomach".

Marketing

22. Marketing, which broadly covers such matters as transport, packaging, grading, exports and publicity as well as the actual sale of produce (and often entails co-operation in many of these matters) is of crucial importance to growers. They are very much concerned that their produce should reach the consumer fresh and in good condition. Measures to improve marketing arrangements could therefore have a material effect on growers' returns and generally on the competitive position of the industry.

TRANSPORT

23. Growers who have hitherto relied on a complex network of railways, with numerous collection points and fairly rapid and reliable deliveries, are now faced with the closing of uneconomic lines and stations and higher rates. This has reduced the convenience of the railway system to many growers. The railheads that remain are generally those that can rely on a regular volume of traffic throughout the year; and many centres that used to cater for a seasonal horticultural traffic have now closed.

24. Present estimates are that between one-quarter and one-third of all fresh horticultural produce still depends upon rail for distribution. Some growers are meeting the changing rail transport pattern by concentrating their produce for bulk despatch by rail, which involves co-operation, particularly for the smaller growers. Convenient access to a railhead may be one of the factors influencing the future location of production.

25. During the examination it became evident that, while growers found that they could generally rely on good arrangements for the despatch of their produce, they had less confidence that it would be delivered in good time from the railhead to the market. A delay of 24 hours in sale could result, with a corresponding loss of freshness and hence of price. It was suggested that, for this reason, some growers who could conveniently use rail transport were coming to rely more and more on road transport—either their own or a contractor's. But at the same time unsatisfactory approaches to some of the main markets, and increasing congestion on the roads, lead to delays in delivery by road.

26. In this context, the redevelopment of the major wholesale markets, which is being encouraged by the grants available under Section 10 of the Agriculture and Horticulture Act, 1964, is of much significance to horticultural producers. Initially, the administrative test of a major market was an actual or potential throughput of £5 million a year; but during 1965 this figure was reduced to £4 million. So far, nineteen markets have satisfied this test, and Appendix VI lists them, with brief notes on the progress of redevelopment.

27. In the longer run, more fundamental changes may occur. Sales by sample, and direct selling by and to large organisations—for instance, from co-operative packing stations to chain stores—may increase. Both these methods would reduce the amount of produce going through the markets and would get produce to the consumer quickly and in good condition, but both require good and consistent quality and continuity of supply. While these new methods of sale are likely to develop, however, it seems likely for the foreseeable future that the bulk of produce will continue to be sold through wholesale markets. A significant problem for all sections of the industry is the cost and strength of containers: there is scope for further work on improved designs more suited to the needs of particular crops.

GRADING

28. Co-operative marketing facilitates the grading of produce for the smaller growers, and growers generally are becoming increasingly conscious of its advantages. National statutory grades will be introduced during 1967 and 1968 for apples, pears, tomatoes, cucumbers and cauliflowers. During 1965, drafts of the grades to be used were under discussion between the agricultural departments and the Farmers' Unions; and an inspectorate was being recruited and trained to operate the scheme.

CO-OPERATION

29. Continuity of supply is another of the advantages of co-operative marketing, especially for individual growers with small acreages, who normally find it hard to maintain continuity. There may be scope also for co-operation in production so that growers marketing through the same co-operative plan their production with a view to securing a steady supply throughout the season. Co-operative marketing has had much help from the grants available under both the Horticulture Act 1960 and the Agriculture and Horticulture Act 1964; and more help, some of it directed not only to co-operative marketing but also to co-operative production, is provided for in the Agriculture Bill now before Parliament. Appendix VII summarises the grants already approved.

30. The nineteen-sixties have seen a few new horticultural marketing co-operatives emerging each year, while existing co-operatives have extended their activities. By the end of 1964, according to statistics tabled by the Farmers' Unions the value of annual sales of horticultural produce by the main co-operatives was approaching £9 million.

STORAGE

31. Storage facilities and techniques are of importance for many horticultural crops. Storage can help to even out supplies, maintain the levels of returns, and keep crops fresh either in the short term or for marketing out of their

normal season. For certain crops short-term storage is an important adjunct to mechanical harvesting, giving time for the proper handling and preparation for market, without loss of freshness, of crops harvested in bulk.

32. The desirability of more research into storage problems, including such matters as variety response, is one of the questions, mentioned in paragraph 51, that have been referred to the Horticultural Advisory Council.

EXPORTS

33. The proportion of total output of horticultural crops that is at present exported is insignificant. Relatively little is known about potential markets overseas, and it is hard for small firms working on their own to enter the export trade. However, during 1965 proposals have been made for the formation of an Agricultural Export Council; and a group of growers and distributors have registered a company whose main object will be to promote exports of horticultural produce. The next examination will consider progress in this field.

PUBLICITY

34. Although several organisations raise money on a voluntary basis from particular sectors of the industry for sales promotion, public relations and educational publicity, and there is further publicity by individuals and organisations both locally and at national shows, there is a general feeling in the industry that more could be done having regard to the scale of the publicity undertaken by our overseas suppliers with funds often derived from their marketing organisations. The attempt to establish publicity councils under the aegis of a Horticultural Marketing Council financed by growers under the Horticulture Act, 1960, proved abortive. While the examination was in progress, proposals were being worked out for the establishment of an Apple and Pear Development Council, which may well provide the prototype for publicity organisations for other sections of the industry. Advertising does, of course, need to be backed by produce that meets consumers' requirements.

Capital Investment and Resources

35. Heavy capital investment is involved in glasshouse and mushroom production and the production and storage of orchard fruit. For other sections of the industry a relatively small injection of capital may often result in a material increase in output or lower running costs. The expansion of production envisaged by the National Plan and the need to develop labour-saving techniques and to provide improved storage facilities all require further capital investment. New buildings and production techniques are being developed which represent a material improvement on traditional methods and should give a good return on the capital invested in them. Credit facilities generally are at present restricted, but the Government backing for guarantees of bank loans provided for horticulture since July, 1964, should be of material help to the industry over the next few years.

36. The one-third grants available under the Horticulture Act 1960 and the Agriculture and Horticulture Act 1964 have prompted a considerable measure of capital investment in the industry. Brief details of the grants paid or committed by the end of November, 1965 are given in Appendix VIII together with a break-down showing for what facilities the grants have been approved. It is notable that the rate of applications has nearly trebled since the 1964 Act was passed. This Appendix also shows what has been approved for grant under the scheme for improving the efficiency of small businesses, and for orchard grubbing.

37. During the examination a special analysis was made of proposals approved for grant under the Horticulture Improvement Scheme between 1st July, 1964 and 31st March, 1965. A point of particular interest which emerged was the wide variation in the amount of grant now going to the different sectors of the industry, which corresponds broadly to the varying importance of capital investment to the different sectors. However, the Horticulture Improvement Scheme 1964 came into operation on 1st July, 1964 and introduced grants for the replacement of glasshouses and for installing heating systems and providing production equipment in glasshouses. Consequently, in the period to which the figures in the following table relate, applications from glasshouse producers were preponderant, in contrast with the four preceding years, when the fruit sector, with its need for cold stores and packing sheds, and equipment to go in them, was taking the lion's share of grants.

TABLE 5
Analysis of Applications Approved July, 1964—March, 1965
(England and Wales only)

Sector	Cost of facilities approved for grant Amount (£'000)	Percentage of total
Glasshouse	1,658	59
Fruit	809	29
Vegetables	167	6
Nursery stock	129	5
Unattributable	25	1
Total	2,788	100

38. In the glasshouse sector, the principal facilities approved for grant in this limited period were heating systems (£811,000), replacement glasshouses (£434,000) and equipment (including irrigation equipment) (£132,000).

39. In the fruit sector the main items were storage, packing and other buildings (£340,000), temperature control (£189,000) and equipment for pest and disease control (£114,000).

40. In the vegetable and nursery stock sectors too the principal facilities approved for grant were buildings (£85,000 and £70,500 respectively).

41. Geographically, most of the approved proposals were in the South East (£1,140,000), Eastern England (£720,000) and Yorkshire/Lancashire (£367,000).

Technical Developments

42. Since the War, technical developments in most sections of the industry in relation to production and preparation for market have been revolutionary in their effect and in the opportunities they offer to progressive growers; and new and important harvesting techniques are being developed. Much time was devoted in the examination to a consideration of these developments, and their adoption by growers, which is crucial to the well-being of the industry. The next few paragraphs provide a summary of the more note-worthy developments that have affected the various sectors of the industry during this period.

Fruit

43. The fruit industry has been greatly helped by the availability of healthy, virus-tested planting material (which has increased yields); the use of suitable herbicides (which have been of special benefit to the soft fruit sector); developments in fertiliser usage; and the new, more effective spray materials for the control of pests and diseases together with machinery for their application (which has reduced labour and increased efficiency). Mechanical aids to cultivation, handling and storage have all effected a reduction in labour use per ton of output; and the use of bulk bins for apples is also combating rising costs of labour. Developments in refrigerated and controlled atmosphere stores for apples and pears have extended the season and aided orderly marketing. And for blackcurrants particularly, mechanical harvesting holds out hopes of greatly reducing picking costs where conditions and scale of growing are suitable for it.

Vegetables

44. Basic cultivations have been aided by the development of such machines as rotary cultivators and reversible ploughs. The application of trace elements can eliminate many disorders due to nutrient deficiencies. Fertiliser placement is now possible and the improvement of drill design and performance, leading to precision drilling, has provided economies in seed and labour. Extensive progress has been made in the control of pests and diseases; and new chemicals and compounds, improved methods of application and new knowledge of virus diseases are other advances which have permitted the development of insecticides and the treatment of seeds. But the biggest advances in vegetable growing have been in weed control which has markedly reduced labour and increased yields. The development of rotary sprinklers has encouraged and extended the use of irrigation. Knowledge is now available about the best times to irrigate different crops and the effect of water on quality, on time of maturity and on disease problems. The ability to determine the soil moisture deficit at

any point in time has enabled growers to apply irrigation on the basis of the calculated water deficit and the known water requirement of the particular crop. More is being learnt of the ways in which growth rate and date of maturity are affected and can even be determined by selection of such factors as variety, sowing date, temperature, crop spacing and cultural treatments. Mechanical harvesting has been developed for a number of crops, and mechanised handling is now advancing rapidly. The use of bed systems of growing has permitted fuller development of several of these advances.

Glasshouse Production

45. Mainly by increasing yields and quality and decreasing labour requirements, technical developments of various kinds have helped to reduce unit costs and to increase profitability. Modern heating systems with automatic control of temperature can substantially increase net margins; automatic control of ventilation increases margins by improving yields and quality as well as by saving labour; CO₂ enrichment can increase yields, typically of tomatoes and lettuces; cultivation on straw bales has brought many benefits, and the growing of cucumbers on the cordon system can reduce labour requirements considerably; the use of spray lines and trickle irrigation, which also contributes to optimum conditions of growth, has reduced labour requirements and increased efficiency. Over this field generally, the value of output is increased and unit costs reduced by recent improvements in glasshouse design and equipment and by the precise control of conditions which these improvements make possible. For tomatoes, improved breeding techniques have already provided varieties which are earlier and of better quality and promise other advantages such as resistance to disease and economy of labour. For mushrooms, the use of labour (other than for picking) has decreased with mechanisation.

Nursery Stock

46. The development of new varieties of greater vigour, of better herbicides and disease and pest control, and of improved methods of cultivation enabling greater density of planting, have all assisted in increasing yields; so has the production of virus-tested fruit stocks. The B.S.I. standards that have recently been announced will be valuable both to the industry and the consumer. The recent development of container-growing has many advantages: mainly, it permits planting out of the normal planting season and facilitates the development of garden centre retailing which encourages purchases throughout the year. Mist propagation has facilitated the rooting of difficult subjects. Mechanical planting, lifting and bundling equipment is now available. For roses, better budding ties have helped yields, and chemical defoliant shows promise of helping to advance the lifting season but must be used with discretion. It was noted that, though work is done at some centres, no centre is specifically charged with research into ornamental plants.

Flowers

47. The temperature treatment of bulbs—including pre-warming before hot-water treatment—has benefited the bulb and bulb-flower industry by

making flower-forcing quicker and cheaper, by promoting the earliness of outdoor crops and by improving quality. The development of better varieties of some flowers has also brought about great advances. Increasing use is now being made of such valuable mechanical devices as bunchers, bulb-counters, bulb-cleaners and grading machines. For carnations, the introduction of wilt-free stock and studies in the timing and spacing of the crop have been beneficial. The control of glasshouse environment—and especially of day-length—has enabled the production of chrysanthemums to be undertaken throughout the year.

48. Though the effect of even the most specific of the improvements mentioned may vary for particular holdings, experiments conducted on various Experimental Horticulture Stations have been found to give rise to striking reductions in costs or improvements in production and gross margins. These experiments have illustrated the benefits of many of the developments mentioned in the preceding paragraphs. The illustrations are used in advisory work: but it might be misleading to quote the figures in this summary without qualifications relating to the circumstances of each grower or season.

49. Although generalisations about so varied an industry as horticulture are dangerous, it is broadly true that in every sector labour is a major item of production costs. The adult male agricultural worker's minimum wage has been increased by about 56 per cent in the past ten years and hours have been reduced. As production methods become increasingly technical and specialised, so will growers need to pay good wages to get and keep the quality of worker they need. So the adoption of methods which result in a greater volume of output per unit of labour employed is of first importance if growers are to maintain and improve their economic position. The fact that growers' prices for the main crops have not greatly changed over the past ten years, at a time when the prices of goods and services have risen substantially, is a reflection of the extent to which the industry has absorbed its increased costs. For the individual, the choice is still between expanding output without any increase in the labour force, or maintaining output with a reduced labour force. Provided the output of the industry as a whole keeps pace with rising demand, either approach would be consistent with the objectives of the National Plan. Each section of the industry, according to its particular problems, has its particular opportunities.

50. A second broad approach is the need increasingly to study consumer requirements and to develop and adopt ways of meeting them. In this way growers should be able to secure better returns from the market and do much to meet overseas competition.

51. In all these fields, where the possibilities are so great, there is much need for detailed research. Consideration of research programmes and needs is a matter for the Horticultural Advisory Council and, in the case of Scotland, for the Horticulture Committee of the Scottish Agricultural Improvement Council; and a variety of suggestions which emerged in the course of the examination has been referred to these bodies for consideration.

52. However, the progress of the industry depends on the readiness of growers to adopt new methods and on the technological skill of the managers and

workers who use them. This underlines the importance of improved facilities for horticultural education, and the work of the horticultural advisory services and the Experimental Horticulture Stations, and the value of such initiatives as that taken by growers' organisations in arranging the "British Growers Look Ahead" and similar conferences. The Horticultural Press also has an important part to play in spreading information on new developments and techniques. The question of education in agriculture and horticulture, including the supply of technicians and those trained in applied science, is being considered by a Committee under the Chairmanship of Sir Harry Pilkington, whose report is expected soon.

53. The recently introduced Farm Business Recording Scheme reflects the growing recognition that records are the key to better management and higher profitability. It is encouraging to see from Appendix VIII that in the past 18 months at least 1,800 small growers have taken business management advice in the course of obtaining approval of their programmes under the Small Horticultural Production Business Scheme. However, for some time much of the technical advice given by the National Agricultural Advisory Service has had a business management element, since what may appear in the first place to be a simple technical problem often needs to be considered in relation to the business as a whole and leads to practical advice in management terms.

Water Resources and Irrigation

54. For many horticultural crops irrigation is in most years essential to profitability, and indeed to the efficient use of the land. High value crops on intensively cultivated land benefit substantially; hence the growing demand for irrigation equipment and the water to go with it.

55. An irrigation survey carried out in October 1963 suggested that about 210,000 acres of agricultural land were being irrigated and that the area under horticultural crops accounted for nearly a quarter of this area—some 48,000 acres. The potential irrigable area of horticultural crops is much greater than this: in 1962 a study group of the Natural Resources (Technical) Committee put it at over 200,000 acres. In glasshouses where crops are entirely dependent on artificial watering, the water need for plant growth alone was put at about 2,000 million gallons per year for 4,400 acres of glass.

56. These estimates show that the present development of irrigation represents a heavy demand for water for irrigation of horticultural crops, in an era when other industrial and domestic needs are rising, too. And growers also need water for other purposes, such as washing crops before marketing them, frost protection and flooding of glasshouse soil.

57. Total horticultural demand for water, as part of the total agricultural demand, is one of the factors that river authorities need to take into account as part of their regional planning of water resources and requirements, a function arising from the Water Resources Act, 1963. An Order under the

Act made in 1964 exempted glasshouse production from the restrictions on irrigation that river authorities can impose in time of water shortage, but outdoor horticultural crops are subject to these restrictions.

58. The prospect is that more and more growers, particularly those relying on surface water from rivers and streams, will need to provide their own storage to ensure a reliable supply. The capital cost of reservoirs is fairly high, especially taking into account the loss of production from the inundated land; but the financial benefits of irrigation are substantial enough for water storage to be economic for many growers. Storage of mains water is common on the smaller holdings, and some of the larger ones already have earth reservoirs for storage of surface and ground water.

59. Investigations into the effective use of irrigation are proceeding. These are important not only to the economics of irrigating but also to its efficiency, for over-watering can be as harmful to crops as drought. It is becoming increasingly possible to judge, crop by crop, the timing and quantity of irrigation that will give best results and to regulate irrigation operations accordingly.

Economic and Financial Data

60. Useful data on representative costs of production in the various sectors of the industry are hard to find and even harder to evaluate. This is primarily because, as was clear throughout the examination, the industry is so diverse in its products and growing methods. Other factors are the inadequacy for this purpose of many growers' records, and the shortage of economists to evaluate such records as are available. The convenient but somewhat artificial grouping into five sectors used for the purpose of this examination has highlighted the problem.

61. The Agricultural Economics Departments of some universities investigate the financial results of samples of horticultural holdings, but the samples are too small and too local to be nationally representative: they are intended for other purposes.

62. A more fruitful approach is the preparation of basic production data for the horticultural management advisory work of the N.A.A.S. Its purpose is to assess typical requirements and costs of different production methods in different regions of the country. The work is not finished yet but the results when published should be a useful guide to the economics of production and a standard against which growers' own results can be judged.

63. The position in the Netherlands, where more data on growers' production costs are available, was examined; but the use made of this information confirmed the view formed during the examination that its greatest value is in the field of advisory work to individual growers, rather than as providing a basis from which the economic position and progress of the industry as a whole can be assessed.

Summary

64. This first examination has been valuable to Ministers and, it is hoped, to the Farmers' Unions in its exploration of many facets of the horticultural industry and the opportunities open to British growers. In the time available many subjects brought up in the examination could not be studied in depth; but these studies can be carried further in the 1967 examination and during 1966 in anticipation of it. The broad picture which emerges is of an industry ready to accept change, with significant possibilities for development on many fronts, as new ideas emerge and recent ideas are put into practice.

APPENDIX I

U. K. CROPPED AREAS—5 YEAR AVERAGES

Vegetables in the open	1952/53 to 1956/57 acres	1956/57 to 1960/61 acres	1960/61 to 1964/65 acres
Beetroot	8,746	9,566	8,738
Carrots	31,226	32,377	31,804
Parsnips	3,945	4,432	4,722
Turnips and Swedes	15,864	12,345	9,488
Onions, dry bulb	4,250	2,889	3,156
Onions, green	3,135	3,105	3,464
Brussels sprouts	47,398	46,080	47,926
Cabbage, kale, etc.	78,347	75,799	71,801
Cauliflower	35,025	39,616	44,206
Peas, harvested dry	119,885	71,497	32,394
Beans, Broad	6,079	9,901	11,601
Beans, Runner and French	9,904	13,106	15,369
Peas, green for market	42,035	32,968	27,377
Peas, green for canning and quick freezing	41,600	61,353	76,990
Celery	5,052	5,759	6,044
Leeks	1,659	1,917	2,085
Lettuce (open)	13,575	14,993	15,724
Rhubarb	6,783	5,750	5,566
Watercress	21,396	647	590
Others		21,967	18,033
Total, in the open	495,904	466,067	437,078
<i>Under Glass</i>			
Tomatoes	2,991	2,672	2,291
Cucumbers	432	456	440
Lettuce	1,447	1,437	1,387
Mushrooms	199	399	635
Other vegetables	568	443	388
Total, under glass	5,637	5,407	5,141
Grand total	501,541	471,474	442,219
<i>Orchard Fruit</i>			
Dessert apples	63,785	65,176	63,719
Cooking apples	70,871	62,987	52,679
Pears	17,097	17,606	16,988
Cider apples	45,354	41,173	33,517
Perry pears			
Cherries	18,016	16,486	13,726
Plums	38,399	31,310	25,107
Others and mixed	2,615	3,363	3,152
<i>Soft Fruit</i>			
Strawberries	19,027	18,336	17,006
Raspberries	10,267	10,375	8,767
Blackcurrants	12,420	12,451	15,456
Gooseberries	6,674	5,872	5,781
Red and White currants	2,848	2,679	2,471
Loganberries			
Blackberries			
Others and mixed			
Total	307,373	287,814	258,369

Bulbs, Flowers and Nursery Stock	England and Wales only		
	1952-1956 acres	1956-1960 acres	1960-1964 acres
Bulbs for Bulbs }	7,310	3,784	5,237
Bulbs for Flowers }		6,601	7,442
All other Flowers in the open }	6,823	6,590	5,848
Hardy Nursery Stock			
1. Fruit trees, stock, etc. }		3,893	3,932
2. Ornamental trees and shrubs }	11,706	5,348	6,220
3. Other Nursery Stock }		3,753	3,579
<i>Under Glass</i>			
Carnations	172	193	209
Chrysanthemums (total grown in autumn and winter)	637	681	724

APPENDIX II

U. K. OUTPUT—5 YEAR AVERAGES

Vegetables in the open	1952/53 to 1956/57 '000 tons	1956/57 to 1960/61 '000 tons	1960/61 to 1964/65 '000 tons
Beetroot	83.2	91.1	93.9
Carrots	280.9	309.1	322.3
Parsnips	36.5	37.5	40.3
Turnips and Swedes	151.3	129.1	132.0
Onions, dry bulb	35.5	23.8	38.5
Onions, green	16.2	15.9	17.7
Brussels sprouts	144.5	148.4	157.3
Cabbage, kale, etc.	528.8	532.0	536.9
Cauliflower	200.0	221.9	252.1
Peas, harvested dry	71.3	42.3	29.6
Beans, Broad	17.4	28.7	39.9
Beans, Runner and French	35.0	51.4	57.1
Peas, green for market	103.6	78.3	88.4
Peas, green for canning and quick freezing	55.1	84.9	130.6
Celery	64.3	87.6	94.2
Leeks	13.1	17.4	18.6
Lettuce (open)	63.9	76.1	100.1
Rhubarb	37.3	34.5	41.8
Watercress	117.2	7.3	5.8
Others		122.0	108.1
<i>Under Glass</i>			
Tomatoes	100.6	92.0	80.1
Cucumbers	29.7	33.4	31.3
Lettuce	11.4	10.3	10.0
Mushrooms	5.5	11.6	19.3
Other vegetables	4.9	4.2	3.9
<i>Orchard Fruit</i>			
Dessert apples	175.1	224.7	255.9
Cooking apples	268.0	259.8	221.1
Pears	44.4	60.2	58.8
Cider apples	68.4	76.4	62.8
Perry pears			
Cherries	24.0	21.5	18.6
Plums	95.2	69.4	62.8
Others and mixed	3.2	3.9	3.5
<i>Soft Fruit</i>			
Strawberries	31.1	29.2	34.7
Raspberries	18.1	17.6	14.1
Blackcurrants	18.7	16.6	23.8
Gooseberries	15.5	13.7	13.5
Red and White currants	5.3	4.5	4.3
Loganberries			
Blackberries			
Others and mixed			

APPENDIX III

CONCENTRATION OF CROPS IN CERTAIN LOCATIONS

Acreages and percentages of some important crops in the more important areas in 1965 compared with 1954

	1954		1965	
	Acres	%	Acres	%
VEGETABLES				
<i>All vegetables in the open (except potatoes):</i>				
England and Wales only	421,927	100	351,196	100
of which Norfolk	40,514	10	50,108	14
Lines (Holland)	33,629	8	35,739	10
Lines (Lindsey)	37,880	9	36,931	11
Yorks.	38,487	9	25,684	7
Essex	35,357	8	17,210	5
Kent	23,395	6	16,818	5
<i>All Cauliflowers</i>				
England and Wales only	33,780	100	42,291	100
of which Lines (Holland)	5,174	15	12,024	28
Cornwall	4,067	12	7,015	17
Kent	5,858	17	5,523	13
<i>All Carrots</i>				
England and Wales only	26,427	100	23,018	100
of which Norfolk	6,802	26	9,582	42
Suffolk	2,983	11	2,507	11
Cambs. and Isle of Ely	2,810	11	3,107	13
GLASSHOUSE PRODUCTION				
<i>Total Glasshouse area</i>				
United Kingdom	4,414	100	3,999	100
of which Lea Valley	965	22	632	16
Lancs.	301	7	275	7
West Sussex	300	7	251	6
Yorks.	216	5	246	6
Scotland	284	6	296	7
<i>Total Glasshouse Tomatoes</i>				
United Kingdom	3,065	100	2,169	100
of which Scotland	241	8	214	10
Lancs.	250	8	200	9
Yorks.	173	6	164	8
Lea Valley	575	19	161	7
West Sussex	212	7	113	5

	1954		1965	
	Acres	%	Acres	%
FLOWERS AND HARDY NURSERY STOCK				
<i>Narcissi</i> (for sale as flowers)				
England and Wales only	2,896	100	4,160	100
of which Lincs (Holland)	1,039	36	1,924	46
Cornwall	693	24	831	20
<i>Hardy Nursery Stock</i>				
England and Wales only	12,175	100	15,100	100
of which Surrey	1,649	14	2,152	14
Essex	638	5	1,009	7
Hants	480	4	905	6
Norfolk	618	5	943	6
FRUIT				
<i>Dessert Apples</i>				
England and Wales only	63,800	100	62,870	100
of which Kent	21,800	34	24,860	40
Essex	8,270	13	8,060	13
Suffolk	3,700	6	5,320	8
<i>Culinary Apples</i>				
England and Wales only	61,400	100	39,410	100
of which Kent	22,770	37	17,740	45
Wisbech (i)	4,730	8	3,790	10
Worcs./Warwicks.	3,910	6	2,590	7
<i>Blackcurrants</i>				
England and Wales only	11,383	100	13,811	100
of which Norfolk	2,335	21	2,576	19
Kent	1,722	15	2,186	16
Hereford	993	9	2,030	15
Worcs.	872	8	1,325	10
<i>Raspberries</i>				
Great Britain	9,966	100	8,304	100
of which Scotland as a whole	6,496	65	6,908	83
Angus and East Perthshire only	5,879	59	6,324	76

(i) Lincs (Holland), Northern part of Isle of Ely, W. Norfolk.

Note.—Agricultural holdings only—based on one or more censuses except apples which are estimated.

APPENDIX IV

IMPORTS OF FRESH FRUIT AND VEGETABLES OF KINDS GROWN IN THE UNITED KINGDOM ON A COMMERCIAL SCALE: AND UNITED KINGDOM OUTPUT OF SUCH PRODUCE

	1954				1959				1964			
	Imports*		U.K. Output†		Imports*		U.K. Output†		Imports*		U.K. Output†‡	
	'000 tons	£'000	'000 tons	£'000	'000 tons	£'000	'000 tons	£'000	'000 tons	£'000	'000 tons	£'000
FRUIT												
Dessert apples (Imports from September/ February)	143.4 (39.2)	10,997.6 (2,681.5)	181.9 —	11,148 —	195.1 (54.6)	15,541.4 (4,931.2)	221.2 —	14,692 —	228.8 (53.2)	22,253.6 (5,472.3)	317.8 —	16,487.5 —
Pears (Imports from September/ December)	52.1 (13.1)	4,387.5 (835.3)	33.3 —	1,731 —	60.1 (13.5)	5,110.6 (1,175.8)	61.4 —	3,781 —	67.6 (15.3)	6,269.1 (1,484.0)	66.7 —	3,930 —
Strawberries (Imports from June/July)	0.8 (0.8)	186.3 (154.4)	34.6 —	4,496 —	0.7 (0.5)	239.6 (149.0)	36.4 —	4,664 —	0.7 (0.3)	352.7 (215.9)	39.6 —	7,566 —
Other fruit.	—	1,169.4	—	17,007	—	1,682.2	—	17,707	—	2,452.2	—	22,616
Total	—	16,740.9	—	34,382	—	22,573.8	—	40,844	—	31,327.7	—	50,599

VEGETABLES

Tomatoes (Imports from May/ October)	186.4 (103.2)	19,966.9 (13,064.0)	104.8	12,177	230.0 (117.6)	25,358.7 (15,643.4)	100.1	10,380	225.2 (121.1)	32,209.7 (19,169.9)	79.8	11,208
Onions (dry bulb) (Imports from September/ December)	214.0 (67.4)	5,016.1 (2,081.8)	35.0	552	220.2 (81.3)	5,305.0 (2,191.7)	18.0	414	200.3 (64.8)	6,655.8 (2,328.2)	54.1	1,144
Cucumbers (Imports from April/ September)	1.1 (0.9)	195.4 (140.4)	31.3	4,059	2.3 (1.3)	415.8 (194.6)	35.5	4,448	19.2 (11.3)	2,782.3 (1,517.6)	29.4	3,528
Cauliflowers	41.6	1,804.2	211.0	6,295	53.0	2,449.5	204.6	5,693	31.4	1,630.4	300.0	10,396
Carrots	12.0	673.9	222.0	4,276	32.5	1,424.3	281.8	3,685	26.5	1,440.9	320.9	4,006
Lettuce	4.1	715.0	79.0	6,739	10.5	1,925.6	88.5	6,672	11.4	2,889.8	116.9	7,099
Other Vegetables (excluding potatoes)	—	579.9	—	38,616	—	1,178.3	—	46,441	—	2,206.1	—	55,823
Total	—	28,951.4	—	72,714	—	38,057.2	—	77,733	—	49,815.0	—	93,204

* Including supplies from the Channel Islands.

† Output relates to crop years beginning in the calendar years indicated.

‡ Provisional.

§ The 1964/65 crop was a record; output over the three seasons 1962/63 to 1964/65 averaged 279 thousand tons.

|| Output in 1959/60 and in 1964/65 was the lowest and highest respectively over the seasons from 1954/55 to 1964/65; average seasonal output over the period was 31,900 tons.

Source: U.K. Output—Ministry of Agriculture, Fisheries and Food.
Imports—H.M. Customs and Excise.

APPENDIX V

ASSESSMENT OF DEMAND IN RELATION TO OTHER FACTORS, FOR CERTAIN FRUITS AND VEGETABLES

These tables show deflated (real) monthly prices, expressed as an index figure so that the average for the twelve months equals 100. Monthly purchases per head are similarly expressed, and the index of demand is derived from these two, as follows.

For each commodity, the price elasticity of demand has been estimated: this may be described as the percentage change in purchases which is associated with a 1 per cent increase in price, other things being equal. If this estimated price elasticity is applied to the seasonal variation in prices, we obtain an estimate of what monthly purchases might have been expected had the underlying strength of consumer demand been steady at all times of the year. For each month, these theoretical purchases may be compared with the actual monthly purchases. The ratio of the two provides the index of demand shown in the third line.

For example, when cauliflower prices are below average, as in August, purchases might be expected to be above average if the pressure of demand were constant. The fact that they are not shows that demand must be low, in this case about two-third of average demand.*

I. Cauliflowers

Pattern of seasonal variation in retail prices, purchases per head and demand for cauliflowers (average 1958-64 = 100)

Indices of:	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Prices (deflated to Jan. 1956 levels) .	116	119	120	113	102	107	96	84	84	82	89	99
Actual purchases per head . . .	55	66	104	148	153	114	102	99	109	134	99	71
Derived demand per head at constant price elasticity of -2.45 . . .	79	101	164	199	160	125	92	65	71	82	75	69

* The arithmetic leading to this conclusion is as follows. Over the whole period considered (1958-64) it was found that when the real price of cauliflowers increased by 1 per cent, on the average purchases decreased by 2.45 per cent, other things being equal. Thus the price elasticity of demand was -2.45, the negative sign indicating that purchases tend to fall when real prices rise. In August, cauliflower prices were on average only 84 per cent of the annual mean. If the pressure of demand were the same at all seasons, one would expect purchases in August to have been 84 per cent raised to the power (-2.45), or 153 per cent of the annual average.(a) In fact, they were only 99 per cent. The ratio of the two figures (99/153 = 0.65) gives the 65 per cent in the last line of the table.

$$\begin{aligned}
 (a) \quad -2.45 \log 0.84 &= -2.45 \times (-0.0757) \\
 &= +0.1854 \\
 &= \log 1.53
 \end{aligned}$$

Demand is largely unsatisfied when there are few alternative foodstuffs available, mainly February to April, and consequently this is the period of greatest potential increase in sales if prices are right. When cauliflowers are more generally available later in the year, demand is critically influenced by price; and even while demand is still strong in May and June, sales largely depend on reasonable prices. By the autumn, although purchases usually increase there is little evidence of unsatisfied demand—no doubt because plenty of alternatives are available—and prices tend then to be lowest.

II. Fresh Brussels Sprouts

Pattern of seasonal variation in retail prices, purchases per head and demand for sprouts (average 1960/61–1963/64 = 100)

Indices of:	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
Prices (deflated to Jan. 1956 levels)	106	87	86	105	104	115
Actual purchases per head	89	143	166	118	108	37
Derived demand per head at constant price elasticity of -1.44	97	118	134	127	113	45

It will be seen that demand for sprouts is strongest during December and falls away as quality declines during February and early March, when in any case the crop comes to an end. However, supplies tend to fall away even more rapidly than the demand, so that prices are usually firm in spite of the decline in quality.

III. Fresh Carrots

Pattern of seasonal variation in retail prices, purchases per head and demand for carrots (average 1958–64 = 100)

Indices of:	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Prices (deflated to Jan. 1956 levels)	85	92	99	113	136	155	138	99	85	79	76	77
Actual purchases per head	144	128	124	103	75	62	61	73	96	118	137	133
Derived demand per head at constant price elasticity of -0.42	135	124	123	108	85	75	70	73	90	107	122	119

Carrots (and root vegetables generally) differ from most green vegetables in that there is only a short off-season, during which although demand is low supplies are even lower and therefore prices are at their highest. The absence of the home product is partly made good at this time by imported carrots whose attractiveness—and therefore price—is enhanced by their being younger than those previously available at the end of the home season.

IV. Leafy Salads

Pattern of seasonal variation in retail prices, purchases per head and demand for leafy salads (average 1958–64 = 100)

Indices of:	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Prices (deflated to Jan. 1956 levels)	158	160	161	135	103	69	56	58	67	85	110	124
Actual purchases per head	30	41	80	161	245	288	257	191	163	78	48	33
Derived demand per head at constant price elasticity of -0.88	45	62	121	210	252	208	154	119	104	63	52	40

Thus demand rises steeply to a peak in May and then falls off rapidly. Purchases are greatest in June and July, when prices fall to their lowest level, about a third of that in early spring.

V. Fresh Tomatoes

Pattern of seasonal variation in retail prices, purchases per head and demand for tomatoes (average 1958-64 = 100)

Indices of:	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Prices (deflated to Jan. 1956 levels) .	94	93	103	118	152	133	104	88	75	85	89	90
Actual purchases per head . .	55	57	67	91	122	162	179	180	156	104	79	63
Derived demand per head at constant price elasticity of -0.50 . .	53	55	68	96	151	187	183	169	135	96	74	60

VI. Apples and Pears

Pattern of seasonal variation in retail prices, purchases per head and demand for apples and pears (average 1958-64 = 100)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
APPLES												
Indices of:												
Prices (deflated to Jan. 1956 levels) .	101	102	107	114	116	121	125	103	77	78	83	87
Actual purchases per head . .	93	110	105	96	99	88	77	86	109	120	117	109
Derived demand per head at constant price elasticity of -0.56 . .	95	111	110	103	108	98	87	87	94	105	105	101
PEARS												
Indices of:												
Prices (deflated to Jan. 1956 levels) .	106	103	109	107	108	111	112	102	89	82	89	90
Actual purchases per head . .	56	71	90	100	96	81	71	139	175	173	118	103
Derived demand per head at constant price elasticity of -1.71 . .	63	74	103	112	109	96	86	143	142	123	96	86

An important difference between apples and pears is that although they have much the same income elasticity of demand (+0.8 and +0.9 respectively) there is a marked difference between their price elasticities: -0.56 apples, -1.71 for pears. The pattern of demand differs from the pattern of purchases more widely for pears than for apples. For both, there are two peaks in demand, in spring and in late summer or autumn. For apples, the former is slightly the more marked, while for pears the latter is much more pronounced. For both fruits, demand is low in July but supplies are even lower, so that prices reach their highest level.

APPENDIX VI

REDEVELOPMENT OF MAJOR WHOLESALE MARKETS

BELFAST	The Belfast Corporation have asked their planning consultant to advise on the location and development of the market.
BIRMINGHAM . .	The local authority is working on plans for a new market.
BRADFORD	The eligibility of this market has only just been established and it is too early to say what redevelopment may take place.
BRENTFORD	The London Borough of Hounslow, which assumed responsibility for this market on 1st April 1965, is considering its future in the light of proposals for the redevelopment of the area in which it is situated.
BRISTOL	Traders in the present local authority market have formed a company to build and operate a new market on a site which they have already acquired.
CARDIFF	Traders formerly in individual premises promoted a company to build and operate a market. The market was opened by Her Majesty the Queen on 25th June 1965.
COVENT GARDEN . .	A private Bill promoted by the Covent Garden Market Authority to enable a new market to be established at Nine Elms, is now in its final Parliamentary stages.
GLASGOW	The Department of Agriculture and Fisheries for Scotland is holding consultations with the Glasgow Corporation about its proposals for a new market at Blochairn and with the traders about their alternative proposals for a new market at Renfrew.
HULL	The present "market" is a concentration of wholesalers in private premises.
LEEDS	Work on a new market began on 1st July 1965 and it is hoped that trading will begin before the end of 1966.
LEICESTER	Traders in the present local authority market are forming a company to build and operate a new market on a site which has been reserved for them.

LIVERPOOL . . .	The local authority has acquired a site for a new market and detailed plans are now being drawn up.
MANCHESTER . . .	The local authority has acquired a site for a new market and detailed plans are now being drawn up.
NEWCASTLE . . .	Traders in the present local authority market are forming a company to build and operate a new market on a site which has been reserved for them.
NOTTINGHAM . . .	The present local authority market was built in 1938 and extended in 1957.
SHEFFIELD . . .	The present local authority market was opened in 1961.
SOUTHAMPTON . . .	The present "market" is a concentration of wholesalers in private premises built over the last fifteen years.
SPITALFIELDS . . .	The Corporation of the City of London is carrying out a programme of major improvements to this market.
STRATFORD . . .	The traders are considering the formation of a consortium with a view to purchasing this market from the British Railways Board and securing its redevelopment.

APPENDIX VII

GRANTS FOR CO-OPERATIVE MARKETING—UNITED KINGDOM SUMMARY OF PROJECTS APPROVED FOR GRANT TO 30.11.65

Type of grant	Number of grants	Total commitment to grant
		£
<i>Section 4 of the Horticulture Act, 1960</i>		
Grants for:—		
(a) Survey and general promotional work	3	28,987
(b) Formation of new co-operatives	19	25,595
(c) Improvement of management and increasing efficiency of existing co-operatives	47	65,222
Total	69	119,804
<i>Working Capital Grants</i> (Section 4 of the Agriculture and Horticulture Act 1964)		
Grants:—		
(a) Towards initial operation	2	11,841
(b) To existing co-operatives.	10	39,985
Total	12	51,826
<i>Market Development Scheme</i>		
Grants towards:—		
(a) Consumer research	1	139
(b) Experiments to improve produce	3	6,192
(c) Experiments to improve handling, storage and packing of produce	2	1,386
(d) Investigation into marketing methods	1	468
(e) Experiments to improve marketing techniques .	3	21,190
Total	10	29,375
<i>Horticulture Improvement Schemes, 1960 and 1964</i>		
Grants to horticultural producers' marketing businesses	197	558,412
U.K. Grand Total	288	759,417

APPENDIX VIII

I HORTICULTURE IMPROVEMENT SCHEME

(Horticultural Production Businesses only)

Summary of Progress to 30th November, 1965

	APPLICATIONS						
	Number received			Number withdrawn or rejected before approval	Approved		Number under consideration
	Under 1960 scheme to 30.6.64	Under 1964 scheme from 1.7.64 to 30.11.65	Total		Number	Estimated cost of proposals	
England and Wales	7,114	6,490	13,604	1,796	10,869	£ 12,775,708	939
Scotland . . .	517	364	881	107	653	640,237	121
Northern Ireland .	230	220	450	76	310	422,300	64
U.K. Total . . .	7,861	7,074	14,935	1,979	11,832	13,838,245	1,124

II SMALL HORTICULTURAL PRODUCTION BUSINESS SCHEME, 1964

Summary of Progress (1.7.64 to 30.11.65)

	APPLICATIONS				
	Number received	Number withdrawn or rejected before approval	Approved		Number under consideration
			Number	Expected grant	
England and Wales .	2,064	170	1,534	£ 603,005	360
Scotland	379	45	265	105,033	69
Northern Ireland . .	45	3	28	8,995	14
U.K. Total	2,488	218	1,827	717,033	443

III SUMMARY OF ORCHARD GRUBBING DONE WITH GRANT-AID

(A) Under Section 3 of the 1964 Act (April 1964 to 30.11.65)

	APPLICATIONS					
	Number received	Number withdrawn or rejected before approval	Approved			Number under consideration
			Number	Estimated cost of work	Grant payable	
England and Wales.	879	66	703	£ 166,843	£ 55,614	110
Scotland						
Northern Ireland	12	2	6	327	109	4
U.K. Total	891	68	709	167,170*	55,723	114

(B) Under the Horticulture Improvement Scheme (1.7.64 to 30.11.65)

	No. of approved proposals	Estimated cost of work	Grant payable
England and Wales	118	£ 41,411*	£ 13,804

* At an estimated average cost of £40-£45 per acre, the total for the period concerned may be taken as some 4,900 acres.

HORTICULTURE IMPROVEMENT SCHEME—ENGLAND AND WALES ONLY—FROM 1960 TO 30.11.65

SUMMARY OF APPROVED PROPOSALS BY FACILITY (HORTICULTURAL PRODUCTION BUSINESSES ONLY)

Facility	Number of Proposals	Estimated cost of Proposals
		£
1. PRODUCTION BUILDINGS—Replacement and reconstruction. (Glasshouses, mushroom and spawn running sheds, rhubarb sheds)	628	1,031,868
2. NON-PRODUCTION BUILDINGS. (Temperature-controlled stores, packing sheds, conditioning houses, welfare facilities and offices and other non-production buildings, yards, loading platforms and ramps)	2,689	3,488,943
3. ORCHARD GRUBBING	947	322,262
4. HEATING SYSTEMS. (New systems*, improvement of existing systems)	2,803	3,304,946
5. SHELTER BELTS	45	4,681
6. REMOVAL OF HEDGES AND OBSTRUCTIONS TO CULTIVATION	98	14,418
7. ANCILLARY GLASSHOUSES (for propagating purposes)	110	25,081

Facility	Number of Proposals	Estimated cost of Proposals
8. *IMPROVEMENT OF WATERCRESS BEDS	4	£ 6,407
9. *PLANT AND EQUIPMENT FOR PRODUCTION BUILDINGS: Control of environment. (Equipment for ventilation, irradiation, day length control, mist spraying, CO ₂ distribution, automatic glasshouse shading, soil and bench warming, bulb conditioning, liquid feeding)	973	370,922
10. *— Irrigation in the open. (Irrigation equipment)	230	64,744
11. *— Preparation of soil compost, etc. (Soil block making machinery, soil shredders, mixers and sterilisers)	353	120,347
12. *— Control of pests. (Plant pot and box cleansing and sterilising machinery, thermostatically controlled warm-water baths, thermostatically controlled cabinets for heat treatment of stock plants, dilutors, power operated spraying and dusting equipment)	464	206,608
13. *— Movement of materials. (Conveyors and elevators)	131	67,354
14. *— Miscellaneous. (Planting and potting machines, power operated orchard pruners, frost protection equipment—other than irrigation equipment)	279	71,600
15. *HARVESTING EQUIPMENT	126	80,373
16. OPERATIONS INCIDENTAL TO ITEMS 1-15 ABOVE	376	64,426
17. SEWAGE AND EFFLUENT DISPOSAL EQUIPMENT	65	16,594
18. ROADS, PATHS, BRIDGES, ETC.	825	378,211
19. GAS OR ELECTRICITY INSTALLATIONS	1,215	222,634
20. WATER SUPPLY INSTALLATIONS	122	17,062
21. FENCES, WALLS AND GATES	172	41,520
22. CATTLE GRIDS	11	1,186
23. THERMAL INSULATION, VAPOUR OR GAS SEALING IN CONDITIONING OR STORAGE BUILDINGS	439	901,677
24. PLANT AND EQUIPMENT IN BUILDINGS FOR STORAGE AND PREPARATION FOR MARKET: Control of temperature of atmosphere	691	1,195,783
25. — Movement of produce or containers	319	103,469
26. — Size, weight and quality grading	817	333,507
27. — Preparation. (Cleaners, brushes, polishers, washing machinery, driers, trough installations (for flowers), dipping tank and sprinkler installations (water-cress), hydro-cooling installations, seed cleaning and sorting machinery, equipment for hot and cold treatment of bulbs, defoliating machinery)	397	198,669
28. — Packing. (Packing tables, benches and stands, fruit packers and box fillers, shrub or tree bundlers, bulb counting machines)	122	68,768
29. — Miscellaneous. (Heating equipment, settling tanks and silt traps, and other specified equipment for storage or preparation for market)	119	29,412
30. OPERATIONS INCIDENTAL TO ITEMS 17-29 ABOVE	147	22,236
Total	15,717	†12,775,708

* Additional facilities introduced under the 1964 Scheme. † Grant payable is about £4.3m.